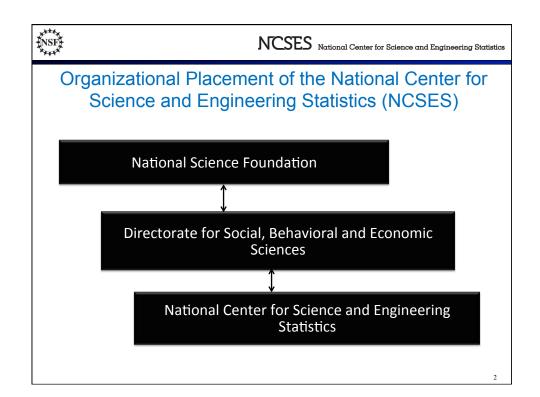
National Center for Science and **Engineering Statistics (NCSES)**

Directorate for Mathematics and Physical Sciences (MPS) Advisory Committee Meeting

February 5, 2016

Emilda B. Rivers Program Director, Human Resources Statistics Program

> National Science Foundation National Center for Science and Engineering Statistics www.nsf.gov/statistics



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NCSES

- · Federal statistical agency within the National Science Foundation
- · Responsibility for statistical data on:
 - Research and development (R&D)
 - Science and Engineering (S&E) workforce
 - US competitiveness in science and technology (S&T) and R&D
 - Condition and progress of science, technology, engineering and mathematics (STEM) education
- · Core activities:
 - Collect, acquire, analyze, report and disseminate statistical data
 - Support research using NCSES data
 - Methodological research
 - Education and training of researchers in large-scale nationally representative data sets



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Community and Outreach

- Community
 - Government/academic/private-sector policymakers
 - Researchers
 - Nonprofit organizations
 - Professional associations
 - Media
 - General public
- Outreach
 - Formal meetings, formal and ad hoc advisory boards
 - Participation in community events (conferences, meetings, etc.)
 - Responding to information requests



Publications and Products

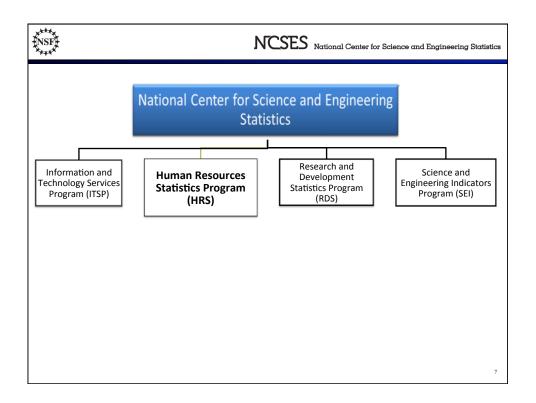
- InfoBriefs highlight results from recent surveys and analyses
- Detailed statistical tables tabular data and technical material, usually for a particular survey and survey year
- Special analytic reports
- Congressionally mandated biennial reports:
 - Science and Engineering Indicators (even numbered years)
 - Women, Minorities, and Persons With Disabilities in Science and Engineering (odd numbered years)
- Other reports:
 - Doctorate Recipients from U.S. Universities
 - National Patterns of R&D Resources



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Publications and Products (continued)

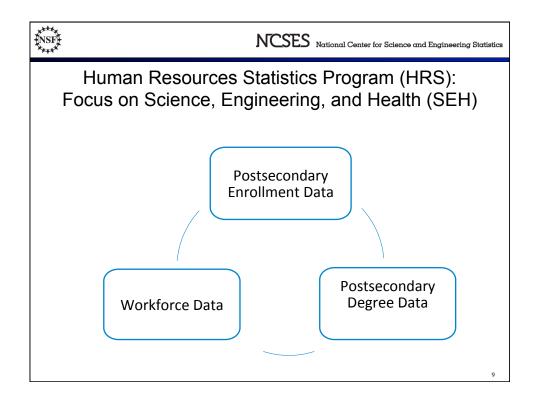
- **Online Databases**
 - SESTAT (Scientists and Engineers Statistical Data System)
 - WebCASPAR (Web Computer-Aided Science Policy Analysis and Research) database system
 - IRIS (Industrial R&D Information System)
 - Other data-driven applications
 - Academic Institutional Profiles
 - State S&E Profiles
 - State Data Tool (S&E Indicators)
- Data files
 - Public Use Files
- Restricted Use Data Files (licensed datasets)

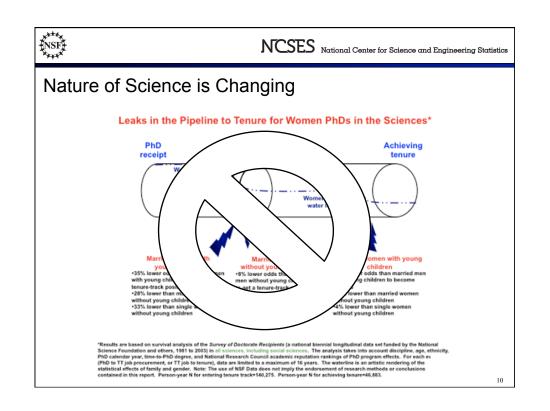




Research and Development Statistics Program (RDS)

- Conduct surveys of R&D performance and/or funding
 - Business R&D and Innovation (annual)
 - Two surveys of federal funding of R&D and S&E (annual)
 - FFRDC R&D (annual)
 - Higher Education R&D (annual)
 - State Agency R&D (annual)
 - Nonprofit sector (pilot this summer)
 - Microbusiness Innovation and R&D (pilot near completion)
- Develop estimates of national R&D, integrating data from all the R&D surveys
- Also collect data on research facilities
 - Survey of academic research facilities (biennial)







HRS Program

Surveys of Institutions

- The Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS)
- The Survey of Postdoctorates in Federally Funded Research and Development Centers (FFRDCs)

Ongoing Surveys of Individuals

- Survey of Earned Doctorates (SED)
- Survey of Doctorate Recipients (SDR)
- National Survey of College Graduates (NSCG)

New Survey of Individuals

Early Career Doctorates Survey (ECDS)

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Survey of Graduate Students and Postdoctorates in Science and Engineering

National Science Foundation and National Institutes of Health



- · Annual census since 1972 of all U.S. academic institutions that grant graduate research degrees in SEH
- · Additional survey: Survey of Postdoctorates in FFRDCs
- · 2013 GSS: 633,010 graduate students from 15,942 units within 564 institutions (99+% RR)

Fall graduate enrollment

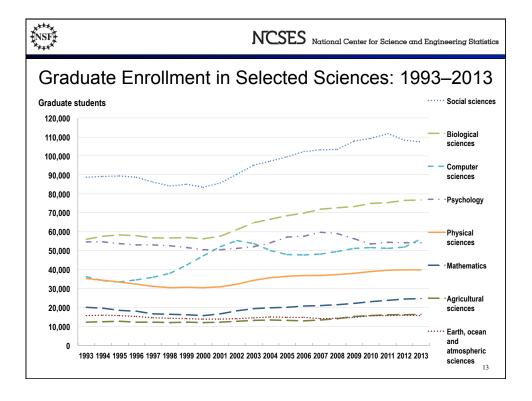
- · Fields of study
- · Enrollment status
- · Demographic categories
- · Major sources &
 - mechanisms of financial support

Postdocs

- Field
- Demographic categories
- Major sources and mechanisms of financial support
- Type of doctorate: PhD, professional, dual
- · Origin of doctorate: U.S. vs non-U.S.

Nonfaculty researchers

- Type of doctorate: PhD, professional, dual





Survey of Earned Doctorates (SED)



- · Annual census of individuals who receive a research doctorate awarded from U.S. institutions in all fields, not limited to S&E
- 2014 SED: 52,760 new doctorate recipients from 421 institutions

Demographics

- Citizenship status
- Disability
- Race/ethnicity

Postgraduation Plans

- Definite commitments for next year
- Sector of employment
- Location of employment
- Starting salary

Educational History

- Degrees
- Financial support
- Education-related debt















Selected Topics Addressed by the SED

- Trends in U.S. doctoral degree production by field, demographic characteristics, and institution
- · Fields with high/low representation of minorities, women, foreign citizens
- · Academic institutions producing the largest number of doctorates in specific fields of study
- · Baccalaureate institutions of Ph.D. recipients by field and demographic characteristics
- · Time to degree and sources of financial support
- · Postgraduation plans



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Survey of Doctorate Recipients (SDR)



Panel survey of individuals who earned a research doctorate in a SEH field from a U.S. academic institution

- · Samples from SED respondents, followed thru age 75
- Includes a survey of U.S.-degreed doctorate recipients not residing in U.S.
- 2013 SDR: estimates for ~840,000 doctorates based on approx 47,000 sample size (76% RR)

Recent training and education

- Additional degrees
- Additional coursework

Employment

- Sector
- Occupation (faculty rank, tenure status)
- Work activities
- Relationship to degree
- Salary
- Overall job satisfaction



Selected Topics Addressed by the SDR

- Comparisons
 - Males and females
 - U.S.-born and foreign-born
 - Doctorate-holders with and without postdoc experience
- · Career choices
 - Employment sector (academe vs. industry)
 - Occupation (research vs. management)
 - Research productivity
 - Salary
 - · Job satisfaction



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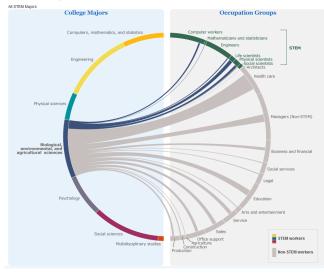
National Survey of College Graduates (NSCG)



- Biennial longitudinal survey of individuals who hold at least a bachelor's degree, and are educated and/or employed in SEH fields
- Data on the "stock" of scientists and engineers, including immigrants
- Sample selected from the annual American Community Survey (ACS)
- 2013 NSCG: ~55 million based on sample of approx 140,000



College Graduates in the U.S.



Partnership: NCSES lead an effort, with support from our community, to add a field of degree question to the American Community Survey, which is conducted by the U.S. Census Bureau.

Impact: There are now national estimates of college graduates, by their field of study, in the American Community Survey

https://www.census.gov/dataviz/visualizations/stem/stem-html/

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Scientists and Engineers Statistical Data System (SESTAT)

- 100,000+ individuals representing over 21 million individuals
 - With a bachelor's degree or above in SEH fields, or
 - Who are in an SEH or SEH-related job
- Starting in 2003, included fields and occupations such as health, math and science teachers, and technology
- Surveys (NSCG and SDR) ask similar questions
- Data on education and employment, work activities, demographic characteristics



Selected SESTAT Data Items

Demographics

- Marital status
- Citizenship status
- Disability

Recent training and education

- · Additional degrees
- Additional coursework

Employment

- Sector
- Occupation (faculty rank, tenure status)
- · Work activities
- Relationship to degree
- Salary
- Overall job satisfaction



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Early Career Doctorates Survey



A national survey to gather in-depth information about U.S. and non-U.S. degreed recent doctorate recipients during the first 10 years of receiving their doctorates.

The focus is on transition to the labor market and early-career employment patterns and characteristics.







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ECDS



- Target population: all individuals, both U.S. and non-U.S. citizens employed in the U.S. who have received a doctorate or doctorateequivalent degree within the past 10 years
- Type of survey: cross sectional survey
 - Stage 1: survey of establishments
 - Stage 2: survey of individuals
- Response mode: internet
- Goals: fill postdoc-related data gaps in current NCSES surveys and collect nationally representative data from early career doctorates

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Selected ECDS Data Items

Employment

- · First position after earning doctorate
- · Current position
- Future plans

Current Position

- Professional activities
- · Compensation and benefits
- Professional vs personal life balance
- Mentoring

Experiences

- Amount of training and guidance
- Opportunities to conduct independent research
- Pathway issues and career transitions



Expected Uses of ECDS Data

Population and Employment Statistics: Monitor trends to inform policy decisions

Counts by sector, discipline, degree type, degree source, compensation, and benefits

ECD Quality and Experience Indicators: Understand the quality of the ECD' contribution to the science and engineering research enterprise

Amount of training and guidance, opportunities to conduct independent research and author publications

Career Transitions: Understand the linkages between early career experiences, particularly postdocs, and longer-term career achievements

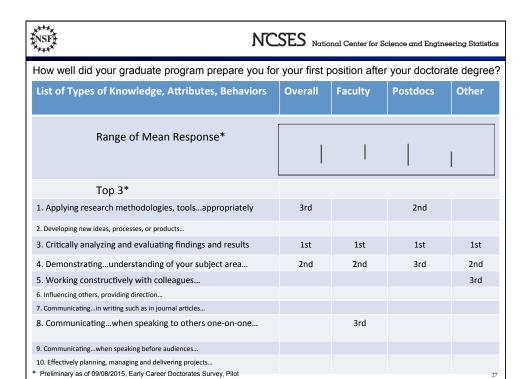
Longitudinal information regarding career aspirations, career progression, and career outcomes

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1	Applying research methodologies, tools and techniques appropriately (METHODOLOGY)
2	Developing new ideas, processes, or products, which are rooted in research (INNOVATION)
3	Critically analyzing and evaluating findings and results (CRITICAL-ANALYTICAL)
4	Demonstrating a theoretical and practical understanding of your subject area and its wider research context (SUBJECT KNOWLEDGE)
5	Influencing others, providing direction and encouraging their contribution (TEAM WORKING)
6	Working constructively with colleagues, acknowledging their contribution (<i>LEADERSHIP</i>)
7	Communicating ideas clearly and persuasively in writing such as in journal articles, grant proposal or reports (<i>EFFECTIVE COMMUNICATION</i>)
8	Communicating ideas clearly and persuasively when speaking to others one-on-one or in small groups (EFFECTIVE COMMUNICATION)
9	Communicating ideas clearly and persuasively when speaking before audiences such as in presentations or lectures (<i>EFFECTIVE COMMUNICATION</i>)
10	Effectively planning, managing and delivering projects on time (PROJECT MANAGEMENT)

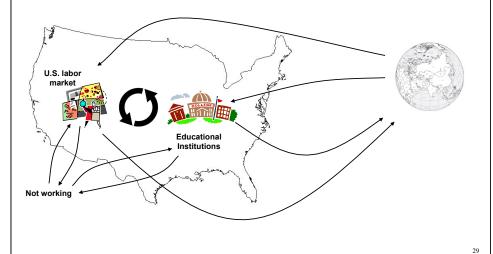


NCSES	NCSES National Center for Science and Engineering Statistics					
To what extent do you agree with the following statements?	Overall	Faculty	Postdocs	Other		
You were well prepared for your first position						
Your doctorate degree enabled you to make progress towards your career aspirations						
Your doctorate degree enabled you to get a position in your chosen career track within 6 months after you completed your degree.						
When you completed your degree, it was clear to you what career opportunities you could aspire to.						
Your doctorate degree enabled you to make a positive contribution at your workplace.						
If you could start all over again, you would get a doctorate degree in your field.						
Your doctorate degree enabled you to be innovative in your work						
In terms of your work, the transition to your first position after your doctorate degree was difficult						
Having a doctorate degree was required by or important to your supervisor.						
You are still using the subject knowledge or methods of your doctorate research.						
Having a doctorate degree made a positive difference in your career path.						
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Flows and Pathways

There is no distinct pipeline that individuals follow – education and career movement is better described as flows and pathways.





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Contact Information

For more information: www.nsf.gov/statistics or email us at ncsesweb@nsf.gov

Survey Program Directors

- · Human Resources Statistics -Emilda Rivers (erivers@nsf.gov, 703-292-7773)
- · Research and Development Statistics -John Jankowski (jjankows@nsf.gov, 703-292-7781)

John Gawalt (jgawalt@nsf.gov, 703-292-7776) Director, NCSES



NCSES Survey Managers

NSF

Survey	Contact	Email	Phone (703 292-xxxx)
GSS	Kelly Kang	kkang@nsf.gov	7796
SED	Lynn Milan	lmilan@nsf.gov	4622
SDR	Steve Proudfoot	sproudfo@nsf.gov	2275
NSRCG/SESTAT	Flora Lan	flan@nsf.gov	4758
NSCG	John Finamore	jfinamor@nsf.gov	2258
SDR	Steve Proudfoot	sproudfo@nsf.gov	2275
ECD	Kelly Phou	kphou@nsf.gov	2275
HERD/FFRDC	Ronda Britt	rbritt@nsf.gov	7765
Federal Funds	Michael Yamaner	myamaner@nsf.gov	7815
Federal Support	Michael Yamaner	myamaner@nsf.gov	7815
Facilities	Mike Gibbons	mgibbons@nsf.gov	7782
BRDIS	Raymond Wolfe	rwolfe@nsf.gov	7789
State R&D	Chris Pece	cpece@nsf.gov	7788
MIST	Audrey Kindlon	akindlon@nsf.gov	2332

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